I have the honour to refer to the Exchange of Notes dated October 24, 1962 concerning the Coordination and Use of Radio Frequencies Above 30 Megacycles per Second and to the Exchange of Notes of June 6 and 24, 1965 amending the Technical Annex of the said Agreement.

During a series of discussions concerning the operation of fixed and mobile radio services along the border, the representatives of our two Governments have reached an understanding which is embodied in the Arrangement between the Department of Communications of Canada and the National Telecommunications and Information Administration and the Federal Communications Commission of the United States Concerning the Use of the 406.1 to 430 MHz in Canada/United States Border Areas annexed to this note.

This Arrangement should be annexed to the above-mentioned Agreement as Arrangement E. The Index to the Technical Annex should be modified in order to add, after item 33, a new item which would read as follows:

<u>item</u>	Frequency Bands Mc/S	Authorized Coordination Agencies or Channels		Coordinating <u>Agreements and Remarks</u>
		<u>u.s.</u>	<u>Canada</u>	
33 bis	406.1-430	NTIA	DOC	Arrangement E

In view of the fact that the United States has not decided how the 421 to 430 MHz band will be shared between the Government and the non-Government users of the spectrum, it may be necessary, once this decision has been made, to change the coordination channel for stations in the fixed and mobile services operating in the band 421 to 430 MHz.

If the proposals outlined above are acceptable to the Government of the United States, I have the honour to propose that this note, which is authentic in English and French, and your reply to that effect shall constitute an agreement between our two Governments which shall enter into force on the date of your reply.

ARRANGEMENT BETWEEN THE DEPARTMENT OF COMMUNICATIONS OF CANADA AND THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION AND THE FEDERAL COMMUNICATIONS COMMISSION OF THE UNITED STATES CONCERNING THE USE OF THE 406.1 MHz to 430 MHz Band in Canada-United States Border Areas

### 1. General

- 1.1 This Arrangement between the Department of Communications of Canada and the National Telecommunications and Information Administration and the Federal Communications Commission of the United States, herein referred to as the Agencies, provides for the operation of Canadian Fixed and Mobile Services and United States Fixed and Mobile Services in the 406.1-430 MHz band and United States Radiolocation Service in the 420-430 MHz band. In accordance with the international Table of Frequency Allocations contained in the Final Acts of the World Administrative Radio Conference (Geneva, 1979), aeronautical mobile radio services are excluded from the band 406.1 to 430 MHz.
- 1.2 Section 6 of this Arrangement sets forth the conditions for the shared use of the 420-430 MHz band by the Fixed and Mobile Services in Canada (the Mobile Service being primary and Fixed Service being secondary in Canada) and the Radiolocation Service in the United States (the Radiolocation Service being primary in the United States).
- 1.3 The areas involved in this Arrangement concerning sharing by the Canadian and United States Fixed and Mobile Services are those set forth in sub-paragraph 2(a) of Arrangement D of this Agreement; hereafter these areas are referred to in this Arrangement as the Coordination Zone.
- 1.4 For the purpose of coordinating assignments to stations in the Fixed and Mobile Services in the 406.1-430 MHz band with 25 kHz spacing between channels and 16 kHz necessary bandwidth, a minimum interstitial channel (12.5 kHz offset) selectivity of 25 dB will be assumed. The standard definition and method of measurement is defined in the United States Electronic Industries Associated (EIA) specification RS-204 B, titled Adjacent Channel Selectivity and Desensitization, dated April 1980.
- 1.5 The coordination channel for this Arrangement is the Department of Communications in Canada and the National Telecommunications and Information Administration in the United States, in accordance with the procedures of Arrangement D of this Agreement.

### 2. Exceptions

2.1 It is recognized that in the band 406.1-420 MHz there are limited requirements for airborne operations. When the possibility exists that assignments outside of the normal Coordination Zone might result in harmful interference to the radio services of the other country due to their particular circumstances, i.e., aircraft altitude, power, the assignment of the frequencies involved will, to the extent practicable, be

- subject to special coordination between the National Telecommunications and Information Administration and the Department of Communications.
- 2.2 The Amateur Service is excluded from the band 420-430 MHz in the Coordination Zone. Additionally, airborne operations associated with stations in the Fixed and Mobile Services are excluded from this band.
- 2.3 Stations in the Fixed and Mobile Services will not operate in the 420-430 MHz band within 250 km of the United States-Canada border in the state of Alaska or the Yukon Territory.
- 3. The Use of the 406.1 420 MHz Band by the Fixed and Mobile Services
- 3.1 Proposed frequency assignments in this band are subject to coordination between the Department of Communications and the National Telecommunications and Information Administration in accordance with the procedures of Arrangement D of this Agreement.
- 3.2 Except for the bands identified in paragraph 3.6, the frequencies identified in paragraph 3.7 and the band identified in paragraph 3.9, all existing frequency assignments in the two countries which are included in the lists appended to this Arrangement as Annex A (Canada) and Annex B (United States) are accepted as coordinated by the Department of Communications and the National Telecommunication and Information Administration and have equal status under this Agreement.
- 3.3 The United States will channel and use the band for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart, from 406.125 to 419.975 MHz inclusive. Canada will channel and use the band for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 406.1125 to 419.9875 MHz inclusive.
- 3.4 The use of a necessary bandwidth greater than 16 kHz is discouraged but is permitted as an exception subject to coordination on a case by case basis in accordance with the procedures specified in Arrangement D of this Agreement.
- 3.5 Canada, within its Coordination Zone, agrees to protect the existing and future unrestricted geographic use in the United States of the bands 406.1875 406.4625 and 408.6875 408.9625 MHz. Coordination with Canada assignments in the United States in these bands is not required.
- 3.6 Use of the bands 406.1875 406.4625 and 408.6875 408.9625 MHz by Canada within its Coordination Zone is to be coordinated on a case by case basis and must meet the terms of 3.5 above. It is understood that any such Canadian use of these bands will only be attempted as a last resort when a requirement cannot be met outside these bands. Any such coordinated radio system must be adjusted or removed if it causes interference to existing United States radio systems or is anticipated to cause interference to planned United States radio systems.

3.7 Canada, within its Coordination Zone, agrees to protect the existing and future unrestricted geographic use in the United States or the following center frequencies with 16 kHz or less necessary bandwidth (all MHz):

415.850	416.000	418.475
415.875	416.025	418.500
415.900	416.375	418.525
415.925	416.400	418.550
415.950	416.425	418.600
415.975	416.450	

Coordination with Canada of assignments in the United States on these frequencies is not required.

- 3.8 Canadian use of the above listed center frequencies within its Coordination Zone is to be coordinated on a case by case basis and must meet the terms of 3.7 above. It is understood that any such Canadian use of these frequencies will only be attempted as a last resort when a requirement cannot be met on other frequencies. Any such coordinated radio system must be adjusted or removed if it causes interference to existing United States radio systems or is anticipated to cause interference to planned United States radio systems.
- 3.9 With the exception of United States use of the frequency 409.625 MHz, the United States, within its Coordination Zone, agrees to protect the existing and future unrestricted geographic use in Canada of the band 409-410 MHz. Canadian use of the 409-410 MHz band is primarily for mobile stations paired with base stations in the 420-421 MHz. Coordination with the United States of assignments in Canada in this band is not required. The protection of the existing and future unrestricted geographic use of the frequency 409.625 in the United States is based on 16 kHz necessary bandwidth.
- 3.10 With the exception of the United States use of the frequency 409.625 MHz, other use of the 409-410 MHz band by the United States within its Coordination Zone is to be coordinated on a case by case basis and must meet the terms of 3.9 above. It is understood that any such United States use of the 409-410 MHz band within its Coordination Zone will only be attempted as a last resort when a requirement cannot be met outside the band. Any such coordinated radio system must be adjusted or removed if it causes interference to existing Canadian radio systems or is anticipated to cause interference to planned radio systems.
- 3.11 It is recognized that Canada and the United States have unrestricted geographic use of the bands and/or frequencies specified in 3.5, 3.7 and 3.9. When the possibility exists that assignments outside the Coordination Zone may result in harmful interference to the radio services of the other country, due to the particular characteristics of such assignments (e.g., antenna height, power, directive arrays), special coordination may be initiated by that Agency which does not have the unrestricted geographic use.

- 4.0 The Use of the 420-421 MHz Band by the Fixed and Mobile Services
- 4.1 The United States, within its Coordination Zone, agrees to protect the existing and future unrestricted geographic use in Canada of the band 420-421 MHz from Fixed and Mobile Services. Canadian use of the 420-421 MHz band is primarily for base stations paired with mobile stations in the 409-410 MHz band. Coordination with the United States of assignments in Canada in this band is not required, except as specified in 6.3.
- 4.2 United States use of the 420-421 MHz band within its Coordination Zone is to be coordinated on a case by case basis and must meet the terms of 4.1 above. It is understood that any such United States use of 420-421 MHz within its Coordination Zone will only be attempted as a last resort when a requirement cannot be met outside the band. Any such coordinated radio system must be adjusted or removed if it causes interference to existing Canadian radio systems or is anticipated to cause interference to planned radio systems.
- 4.3 It is recognized that Canada has unrestricted geographic use in Canada of the band 420-421 MHz, except as specified in Section 6. When the possibility exists that assignments in the Fixed and Mobile Services outside of the Coordination Zone in the United States might result in harmful interference to the radio services in Canada, due to the particular characteristics of the U.S. assignments (e.g., antenna height, power, directive arrays), the U.S. Agency may effect special coordination of the frequencies involved.
- 5. The Use of the 421-430 MHz Band by the Fixed and Mobile Services
- 5.1 Sharing of this band is carried out by the Agencies within the terms and conditions specified in this section. Figures 1, 2 and 3 represent the text of this section in chart and map form.
- 5.2 The 421.000-424.9875 MHz and 426.000-429.9875 MHz bands will be used for Fixed and Mobile Service systems which will operate on frequency pairs: one frequency from each band. Mobile systems will operate with the mobile receivers on the lower band and mobile transmitters on the upper band. The 424.9875-426.000 MHz band will also be utilized for Fixed and Mobile Service systems.
- 5.3 Except as provided in Paragraph 5.4 and Section 6, the 421-430 MHz band will be shared between the two countries as follows:
  - a) Canada will have unrestricted geographic use of the bands 421.000-423.000 MHz and 425.500 428.000 MHz.
  - b) The United States will have unrestricted geographic use of the bands 423.0125 425.4875 MHz and 428.0125 429.9875 MHz.

- 5.4 In recognition of demographic circumstances, the division of spectrum between Canada and the United States varies from the general sharing provisions of Paragraph 5.3 in the two sectors defined below:
  - a) Sector I is defined to be the portions of the Coordination Zone in the United States and Canada, bounded on the west by 85°W. longitude and on the east by 81°W. longitude. In this sector of the Coordination Zone, the United States will have the unrestricted geographic use of the bands 422.1875 425.1875 MHz and 427.1875 429.9875 MHz; Canada will have the unrestricted geographic use of the bands 421.000 422.175 MHz, and 425.500 427.175 MHz.
  - b) Sector II is defined to be the portions of the Coordination Zone in the United States and Canada bounded on the west by 81°W. longitude and on the east by 71°W. longitude. In this sector of the Coordination Zone, the United States will have the unrestricted geographic use of the bands 423.8125 425.4875 MHz and 428.8125 429.9875 MHz; Canada will have the unrestricted geographic use of the bands 421.000 423.800 MHz and 425.500 428.800 MHz.
- 5.5 As a result of the special sharing arrangements of Paragraph 5.4, the overlap of frequency bands occurs in the following geographical areas:
- 5.5.1 The geographical area in Canada is enclosed by the United States-Canada border; the meridian 71°W.; and the line beginning at the intersection of 72°20′W. and the United States-Canada border, thence running north along the meridian 72°20′W. to the intersection of 46°N., thence running east along 46°N. to the meridian 71°W. Canada will channel and use the 423.0125 423.800 MHz and 428.0125 428.800 MHz bands for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 423.0375 to 423.7875 MHz inclusive and 428.0375 to 428.7875 MHz inclusive.

The geographical area in the United States is enclosed by United States-Canada border; the meridian 71°W.; and the line beginning at the intersection of 44°13′N., 71°W.; running by great circle arc to the intersection of 45°N. and 69°40′W., thence north along the meridian 69°40′W., to the intersection of the United States-Canada border. The United States will channel and use the 423.0125 - 423.800 MHz and 428.0125 - 428.000 MHz bands for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 423.025 to 423.775 MHz inclusive and 428.025 to 428.775 MHz inclusive.

Coordination of proposed frequency assignments in the bands 423.0125 - 423.800 MHz and 428.0125 - 428.800 MHz is required in two areas as follows:

a) The geographical area in Canada is enclosed by the United States-Canada border; the meridian 71°W.; and the line beginning at the intersection of 72°W. and the United States-Canada border, thence running north along meridian 72°W. to the intersection of 45°45′N., thence running along 45°45′N. to the meridian 71°W.

- b) The geographical area in the United States is enclosed by the United States-Canada border; the meridian 71°W. and the line beginning at the intersection of 44°25'N. and 71°W., thence running by great circle arc to the intersection of 45°N. and 70°W., thence north along meridian 70°W. to the intersection of 45°45'N., thence running west along 45°45'N. to the intersection of the United States-Canada border.
- 5.5.2 Within the land area in the United States enclosed by the line of 81°W. longitude, the arc of a circle of 120 km radius centered at the intersection of 81°W. longitude and the northern shore of Lake Erie and drawn clockwise from the southerly intersection with 81°W longitude to the westerly intersection with the United States-Canada border and the United States-Canada border, the United States will channel and use the bands 422.1875 423.800 MHz and 427.1875 428.800 MHz for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 422.200 to 423.775 MHz inclusive and 427.200 to 428.775 MHz inclusive.

Within the land area in Canada enclosed by the line of 81°W. longitude, the arc of a circle of 120 km radius centered at the intersection of 81°W. longitude, the arc of a circle of 120 km radius centered at the intersection of 81°W. longitude and the southern shore of Lake Erie drawn clockwise from the northerly intersection with 81°W. longitude to the easterly intersection with the United States-Canada border, and the United States-Canada border, Canada will channel and use the bands 422.1875 - 423.800 MHz and 427.1875 - 428.800 MHz for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 422.2125 to 423.7875 MHz inclusive and 427.2125 to 428.7875 MHz inclusive.

5.5.3 Within the land area in the United States enclosed by the line of 85°W. longitude, the arc of a circle of 120 km radius centered at the intersection of 85°W. longitude to the easterly intersection with the United States-Canada border, and the United States-Canada border, the United States will channel and use the bands 422.1875 - 423.000 MHz and 427.1875 - 428.000 MHz for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 422.200 to 422.975 MHz and 427.200 to 427.975 MHz inclusive.

Within the land area in Canada enclosed by the line of 85°W. longitude, the arc of a circle of 120 km radius centered at the intersection of 85°W. longitude and Michigan-Lake Superior shore, drawn counter-clockwise from the northerly intersection with 85°W. longitude to the westerly intersection with the United States-Canada border, and the United States-Canada border, Canada will channel and use the bands 422.1875 - 423.000 MHz and 427.1875 - 428.000 MHz for assignments with 16 kHz or less necessary bandwidth on center frequencies spaced 25 kHz apart from 422.2125 to 422.9875 MHz inclusive and 427.2125 to 427.9875 MHz inclusive.

In order to minimize the need for coordination in the band 421-430 MHz, Effective Radiated Power (ERP) and Effective Antenna Height (EAH) guidelines have been established as provided in Annex C. If these ERP values are exceeded, within the corresponding EAH ranges, coordination is required in accordance with the procedures specified in Arrangement D of this Agreement.

- 6. Conditions for the Shared Use of the 420-430 MHz Band by the Canadian Fixed and Mobile Services with the United States Radiolocation Service
- 6.1 Existing United States fixed installation radars, with exception of the installation at Concrete, N.D. and those in Alaska, which will receive or cause harmful interference from or to fixed and mobile operations in Canadian territory, will restrict their operational use to the 430-450 MHz band except during emergency periods when the United States reserves the right to operate all radiolocation devices on an unrestricted basis. The United States radar at Concrete, N.D. and Canadian fixed and mobile system power and height restrictions.

No use of this band by the Fixed and Mobile Services will be allowed to adversely impact the operation of the radar at Concrete, N.D. If the United States reports harmful interference to its radar at Concrete, N.D., which is caused by fixed or mobile operations in Canada, Canada will cooperate in the immediate identification and elimination of such harmful interference. Subsequently, the United States will cooperate to attempt to reach a mutually satisfactory resolution of the problem.

- 6.2 The United States reserves the right, irrespective of other provisions of this Arrangement, to operate in the band 420-430 MHz radiolocation stations onboard fixed wing aircraft. However, the United States will minimize use of this band on flights when they are within possible interference range of fixed and mobile operations in major Canadian population areas. If Canada reports harmful interference to Canadian fixed or mobile operations which is caused by radiolocation transmissions from United States fixed wing aircraft, the United States will cooperate in resolution of such harmful interference to the maximum extent possible.
- 6.3 Proposed assignments for Canadian fixed and mobile systems which are not in accordance with the constraints specified for mutual compatibility with the radar at Concrete, N.D. and with radars aboard U.S. ships transiting the Strait of Juan de Fuca and Puget Sound and any other proposed assignment whose compatibility with these radiolocation units is in doubt, will be coordinated with the National Telecommunications and Information Administration.
- 6.4 Experimental research and development transmissions by fixed radiolocation systems in this band in the United States within 250 km of the United States-Canada border will be on a non-interference basis and with notification to Canada.
- 6.5 Except for operations on fixed wing aircraft, United States tactical and training radiolocation operations in the 420-430 MHz band will be on a non-interference basis.

Except for the state of Alaska, any future fixed installation radiolocation system proposed for United States operation within 250 km of the United States-Canada border which would normally operate in the 420-430 MHz band will be subject to prior coordination with Canada. The United States will confer with Canada concerning proposed modifications to the characteristics of current radiolocation systems or their replacements, if such modifications or replacements could impose further restrictions on Canadian operations in the Fixed and Mobile Services. In the event that radiolocation operations in the band 420-430 MHz, at Concrete, N.D. or on ships in the Strait of Juan de Fuca are terminated the United States will notify Canada, and the special arrangements herein will cease to apply in the affected Canadian area.

### ANNEX C

### LIMITS OF EFFECTIVE RADIATED POWER AND EFFECTIVE ANTENNA HEIGHT FOR THE BAND 421-430 MHz

Effective Radiated Power (ERP) is defined as the product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.

For base stations in the Coordination Zone, Table C1 lists the limits of ERP corresponding to the Effective Antenna Height (EAH) ranges shown. EAH is calculated by subtracting the Assumed Average Terrain Elevation (AATE) given in Table C2 from the antenna elevation above mean sea level.

Effective Antenna		Maximum Effective	
Feet	Metres	Radiated Power (ERP) towards the border Watts	
up to 500	up to 152	250	
501 - 1000	153-305	130	
1001-1500	306-457	75	
1501-2000	458-609	40 ,	
2001-2500	610-762	20	
2501-3000	763-914	15	
3001-4000	915-1210	10	
above 4000	above 1210	5	

Table C1
Limits of ERP and EAH

Table C2 lists the values of Assumed Average Terrain Elevations (AATE) within the Coordination Zone on both sides of the United States-Canada Border.

Longitude (φ)	Latitude (Ω)	Assumed Average Terrain Elevations			
	(°North)	United States		Canada	
(°West)		Feet	Metres	Feet	Metres
65 ≤ φ < 69	Ω < 45	0	0	0	0
_ *	45 ≤ Ω < 46	300	91	300	91
· •	Ω ≥ 46	1000	305	1000	305
69 ≤ φ < 73	all	2000	609	1000	305
73 ≤ φ < 74	*	500	152	500	152
74 ≤ φ < 78	•	250	76	250	76
78 ≤ φ < 80	Ω < 43	500	152	500	152
	<b>Ω</b> ≥ 43	250	76	250	76
80 ≤ ¢ < 90	all	600	183	600	183
90 ≤ φ < 98	H	1000	305	1000	305
98 ≤ φ < 102		1500	457	1500	457
102 ≤ φ < 108	*	2500	762	2500	762
108 <u>≤</u> φ < 111	•	3500	1066	3500	1066
111 <u>&lt;</u>	•	4000	1219	3500	1066
113 ≤ ¢ < 114	•	5000	1324	4000	1219
114 ≤ ¢ < 121.5	<b>x</b>	3000	914	3000	914
0 ≥ 121.3		0	0	0	0

Table C2
Values of Assumed Average Terrain Elevation (AATE)

Figure C.1.

# CANADA / UNITED STATES SHARING ARRANGEMENT

### 421 - 430 MHz BAND

## ASSUMED AVERAGE TERRAIN ELEVATIONS

MAP ILLUSTRATING ASSUMED AVERAGE TERRAIN ELEVATIONS DEFINED IN TABLE C2 FOR USE IN DETERMINING EFFECTIVE ANTENNA HEIGHT IN CONJUNCTION WITH POWER / HEIGHT EQUIVALENCE TABLE C1

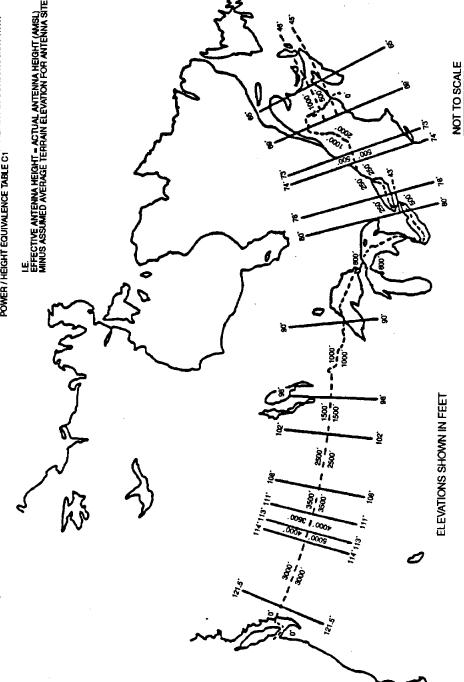
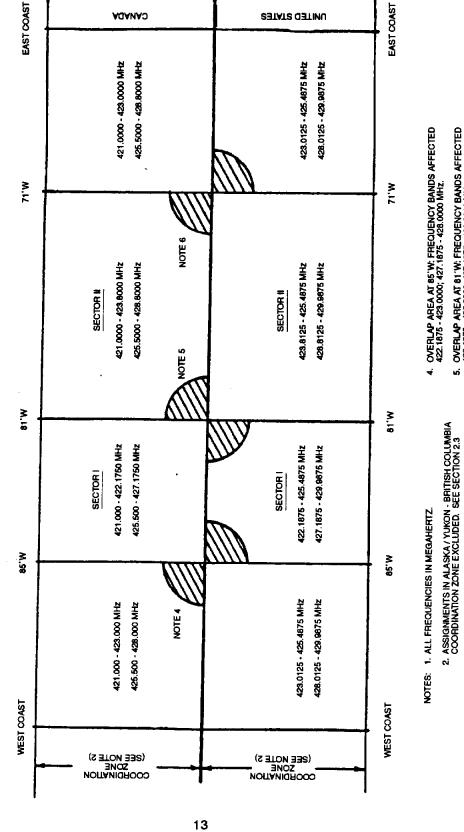


Figure 1

# CANADA / UNITED STATES SHARING ARRANGEMENT

421 - 430 MHz BAND



OVERLAP AREA AT 81"W; FREQUENCY BANDS AFFECTED 422, 1875 - 423,8000; 427,1875 - 428,8000 MHz.

3. ASSIGNMENTS SUBJECT TO ANNEX C REQUIREMENTS.

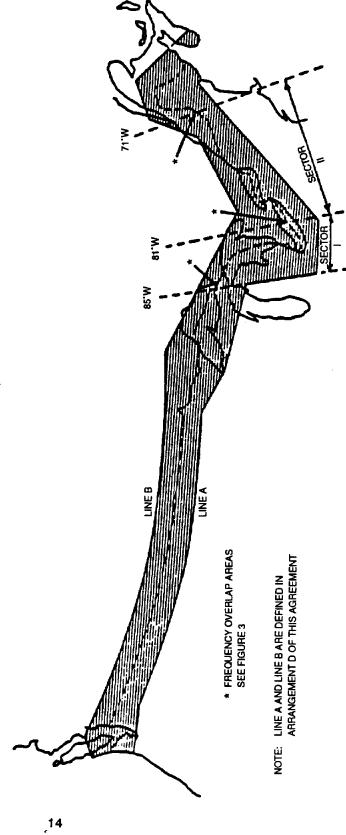
OVERLAP AREA AT 71 'W: FREQUENCY BANDS AFFECTED 423.0125 - 423.8000; 428.0125 - 428.8000 MHz.

# CANADA / UNITED STATES SHARING ARRANGEMENT

421 - 430 MHz BAND

**COORDINATION ZONE** 

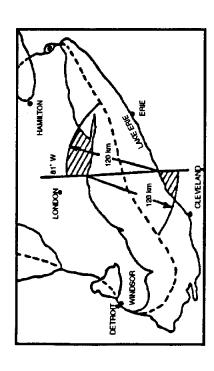
NOT TO SCALE



## SAULT STE. MARIE LAKE LAKE

PERMITTED CENTRE FREQUENCIES (25 kHz SPACING)

CANADA 422.2125 - 422.9875 MHz U.S. 422.200 - 422.975 MHz 427.2125 - 427.9875 MHz 427.200 - 427.975 MHz



PERMITTED CENTRE FREQUENCIES (25 kHz SPACING)

CANADA 422.2125 - 423.7875 MHz U.S. 422.200 - 423.775 MHz 427.2125 - 428.7875 MHz

### Figure 3

# CANADA / UNITED STATES SHARING ARRANGEMENT

### 421 - 430 MHz BAND

### BAND OVERLAP COORDINATION

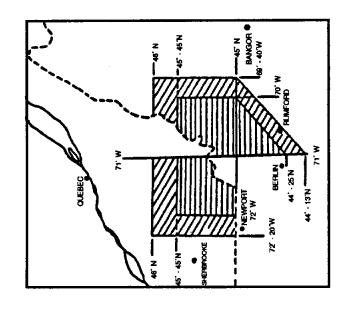
₹ **|||**|

AREAS IN WHICH COORDINATION IS REQUIRED

AREAS IN WHICH COORDINATION IS NOT REQUIRED

US / CANADA BORDER

### NOT TO SCALE



### PERMITTED CENTRE FREQUENCIES (25 KHz SPACING)

CANADA 423.0375 - 423.7875 MHz U.S. 423.025 - 423.775 MHz 428.0375 - 428.775 MHz